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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/126,748	04/19/2002	Kari Ullakko	PAT107DIV2	4771

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EXAMINER

DOUGHERTY, THOMAS M

ART UNIT	PAPER NUMBER
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2834

DATE MAILED: 01/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/996,981

Applicant(s)

YU ET AL.

Examiner

Rodney E Fuller

Art Unit

2851

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following items:
 - a. On page 13, lines 1-2, the specification states "...the mask adjuster 326, the heating factor adjuster 326." The reference number after the term "mask adjuster" appears to be a typographical error.
Appropriate correction is required.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the structure in claim 6 "wherein the variable transmission mask comprises a sensor" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claim 6 is objected to because of the following items:

Claim 6 sets forth that "the variable transmission mask comprises a sensor to at least indirectly measure the focus." However, on page 11, paragraph 0022, the specification states that "the sensor 322, which is depicted in FIG. 3, is communicatively coupled to the mask 308." Hence, the specification nor the drawings support the claim language wherein the "variable transmission mask comprises a sensor."

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 1, 6 and 10 sets forth that the “variable transmission mask” indirectly measures focus. However, the specification does not disclose how a “variable transmission mask” can measure focus either indirectly or directly. A variable transmission mask such as an LCD is used to change the intensity of the light passing it and in general can in no way “measure” the focus of light.

Claims 1, 2, 3, 4, 5, 11 and 16 set forth that the “variable transmission mask” adjusts the focus of the exposure system. However, the specification does not disclose how adjusting the transmission (i.e., intensity of the light) will in any way adjust the focus of the exposure system.

Claim 9 sets forth that the “variable transmission mask” directly measures the focus. As above, the specification does not disclose how a “variable transmission mask” can measure focus either indirectly or directly.

Claims 11, 12 and 15 set forth that a “sensor” is used to indirectly measure the focus. However, the specification states that “the sensor 322, which is depicted in FIG. 3, is communicatively coupled to the mask 308,” and the drawings show that the sensor 322 is not in the optical path of the light. Thus, the specification / drawings does not disclose how the “sensor 322” can measure focus either indirectly or directly.

Claim 14 sets forth that the “sensor” directly measures the focus. As above, the specification does not disclose how the “sensor” can measure focus either indirectly or directly.

Claim 16, 19 and 20 sets forth the method of “indirectly measuring focus.” As above, the specification does not disclose a method that can measure focus either indirectly or directly.

Claims 2-10 depend from claim 1 and therefore include the deficiencies of claim 1.

Claims 12-15 depend from claim 11 and therefore include the deficiencies of claim 11.

Claims 17-20 depend from claim 16 and therefore include the deficiencies of claim 16.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-6, 9-11, 14-16, 19 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Lin (US 6,486,939).

As best the examiner is able to ascertain the claimed invention, Lin (US 6,486,939) discloses all the structure set forth in the claims. Regarding claims 1, 11 and 16, Lin discloses “an exposure and alignment unit (Fig. 1D, ref.#s ILM, PLC) including a light source (column 4, line 40) and a lens (Fig. 1D, ref.# ILC), a variable transmission mask (Fig. 1D, TM) under the lens to at least indirectly measure focus (column 6, line 13) and adjust the focus in real time in response to determining that the focus is out of specification; and a stage (Fig. 1D., ref.# ST) on which a wafer (Fig. 1D, ref.# W) is placed for exposure to the light source through on of a mask and reticle.”

Regarding claims 2 and 11, Lin discloses “wherein the variable transmission mask normally has a substantially high transmission of light rating that can be adjusted downward to adjust the focus in response to determining that the focus is out of specification.” (column 3, lines 26-39)

Regarding claims 3, 5 and 11, Lin discloses “a mask adjuster (Fig. 1D, ref.# 26) to adjust the transmission of the light rating downward to adjust the focus in response to determining the focus is out of specification.” (column 3, lines 26-39)

Regarding claim 4, Lin discloses “wherein the variable transmission mask comprises a liquid crystal display (LCD) that can be darkened to reduce the transmission

of light to adjust the focus in response to determining that the focus is out of specification.” (column 1, line 19-20)

Regarding claim 6, 10, 15 and 19, Lin discloses “wherein the variable transmission mask comprises a sensor (Fig. 1D, ref.# CCD) to at least indirectly measure the focus.”

Regarding claim 9, 14 and 20, Lin discloses “wherein the variable transmission mask directly measures the focus.” Note: Lin measures the focus with the mask (Fig. 1D, ref.# TM) along with the sensor (Fig. 1D, ref.# CCD).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 7, 8, 12, 13, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (US 6,486,939) in view of Nishi, et al. (US 5,883,704).

As best the examiner is able to ascertain the claimed invention, Lin (US 6,486,939) discloses all the structure set forth in the claims except for the limitation of (claims 7, 12, 17) “a heating factor adjuster to adjust a heating factor of the exposure and alignment unit to adjust the focus in response to determining that the focus is out of specification.” However, Nishi discloses (see abstract, Figure. 1, ref.# 13) that a temperature control device (i.e., a heating adjuster) that is used to adjust the image characteristics (i.e., focus) of projection optical system is routine in the art. Thus, it

would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Lin by including “a heating factor adjuster to adjust a heating factor of the exposure and alignment unit to adjust the focus in response to determining that the focus is out of specification.” The ordinary artisan would have been motivated to modify Lin in the manner described above to compensate for distortion (i.e., correct for focus errors) resulting by heating of the lenses or changes in the environmental conditions as described by Nishi in column 2, lines 1-8.

Regarding claims 8, 12 and 18, a further difference between Lin and the claimed invention is that Lin does not explicitly disclose “a stage adjuster to adjust the stage vertically to adjust the focus in response to determining that the focus is out of specification.” However, Nishi discloses (Fig. 1, ref.# 2, 11 and Z axis; column 10, lines 7-10) that “a stage adjuster to adjust the stage vertically to adjust the focus in response to determining that the focus is out of specification” is routine in the art. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Lin by including “a stage adjuster to adjust the stage vertically to adjust the focus in response to determining that the focus is out of specification.” The ordinary artisan would have been motivated to modify Lin in the manner described above to compensate for distortion (i.e., correct for focus errors).

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tsukuda (US 6,333,780) discloses a liquid crystal display (LCD) that “...can control

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both the intensity and phase passing through, thereby to optimize the resolution and depth of focus.”

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney Fuller whose telephone number is (703) 306-5641. The examiner can normally be reached on Monday through Friday from 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Russ Adams, can be reached on (703) 308-2847.

Rodney Fuller
Primary Examiner

A handwritten signature in black ink, appearing to read 'R. Fuller', with a stylized flourish at the end.

January 17, 2003